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ABSTRACT

As one in a series of two teacher's guides dealing with environmental education, this publication for grades K-6 contains basic concepts, activities, and questions designed to emphasize the primary role of man as a participant in, rather than master of, his natural surroundings. Topics covered include survival, interdependence, scarcity, recycling, right vs. responsibility, planning, valuing, social forces, and optimism. For each concept or generalization, activities which the teacher might conduct are suggested accompanied by several probing questions. Activities are not intended to reflect a subject matter orientation. Three appendices provide useful information as to (1) a list of subject headings and topics pertinent to the environment; (2) periodical, general, and film indexes featuring environmental concerns; (3) individuals, groups, and government agencies that may serve as resources of information or as classroom speakers on the environmental issue. (BL)

Environmental Education Instructional Activities

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Environmental Education Instructional Activities

Theme

Man: Steward*of his Environment

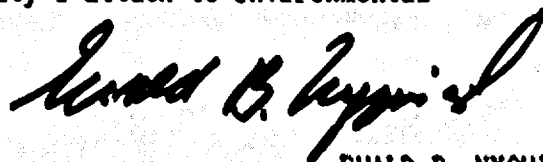
Foreword

Ecological despoliation proceeds apace. Man threatens to destroy the biosphere. There is increasing awareness of the need to protect and restore the environment from the unforeseen consequences of our own activities. Yet, such awareness must be accelerated since at its present rate, it is unlikely to influence practical decisionmaking by government, industry, nor the man on farm or street.

Technology and population continue to expand in alarming proportions with little concern for future implications. Under such circumstances, it is imperative that we develop knowledge and understandings which will allow us to create individual and collective harmony with our world. In short, we have reached the point where we must understand that every significant activity undertaken may have potential consequences that can affect the entire world.

In light of this, the State Education Department has accepted the responsibility for developing an awareness of and a responsibility to the environment. Environmental education should be an integral part of the school curriculum and extend from elementary school through continuing education. In the formative, elementary years, children can be exposed to a variety of experiences that will contribute to their understanding of the environment and an appreciation of its beauty and value. At the secondary level, students may become involved with community problems and those factors that affect the environment. Through continuing education, citizens can become better informed about current environmental problems and be motivated to solve such problems.

I commend these instructional materials to the schools in the trust that administrators, boards, and teachers share my deep concerns and the high priority I attach to environmental education.



EWALD B. NYQUIST
Commissioner of Education

Rationale

The fragile and finite nature of the environment, which is finally becoming real and urgent in terms of popular awareness, decrees a role for man which heretofore has not been clearly defined or responsibly adhered to. As the most sophisticated participant in it, man must be the STEWARD of this environment.

More specifically stated, the understanding and greater knowledge of the INTERDEPENDENCE of living things with themselves and their environment should delineate man's PLAN for the well-being and SURVIVAL of himself and his environment. Recognition of certain absolutes of the physical world such as RECYCLEMENT and SCARCITY should make imperative the consideration of VALUES, choices, and alternatives which, for the most part, have not previously been significant factors in man's thinking.

Man has a RESPONSIBILITY toward his natural surroundings, and therefore to himself, if we accept the concept of interdependence. But to date, he has been ignorant of, or disinterested in, the consequences of his arbitrary manipulation of the environment. He has exercised his presumed RIGHT with little regard for the effect of these actions. Acceptance of his implicit responsibilities will permit man to marshal and direct the SOCIAL FORCES which will redress the current ecological imbalance and to OPTIMISTICALLY face a future of greater harmony with his environment.

Introduction

Not enough of us who worked on this publication, who read its contents, or who share our position in life, can act quickly or effectively enough to completely redress the imbalance which exists in man's relationship with his environment. We must take whatever measures are necessary to check our exploitation and wastefulness and, more importantly, we must inculcate in our children values and attitudes which are consistent with the preservation of the environment.

Thus, the effort which this publication represents was conceived as an initial and exploratory attempt to couch a small part of the school's curricular preoccupation in terms which emphasize the primary role of man as a participant in, rather than as master of, his natural surroundings.

There are basic concepts which underlie man's natural existence, some of which have been used in this publication to organize some suppositions about this existence. So stated, these suppositions have some serious implications for the manner in which we should live. The activities assigned to each of these suppositions or generalizations are presented in the hope that participation will enhance understanding. The questions which accompany each activity should serve as guides to the direction or objective implicit in the activity.

The activities are not intended to reflect a subject matter orientation, although some will obviously lend themselves more readily to one situation than to another. The object is that any teacher concerned about the environment will feel prompted to make use of these activities. If use of the publication in this manner suggests to a teacher that some overt, classroom attention to the problem is justified, one goal has been achieved. If the generalizations and activities influence a child to rethink an attitude, question a commonplace, or make a value judgment, then something more has been achieved.

Beyond the concepts, generalizations, and activities, the publication has three appendixes which provide useful information:

- Appendix A is a list of subject headings intended to facilitate use of a library's resources in augmenting teacher and student awareness of the environmental question. The list is detailed and it encompasses most topics pertinent to the environment.
- Appendix B furnishes a general list of indexes, names of periodicals which frequently highlight environmental concerns, a list of periodicals which treat the environment as a continuing feature, and a list of authors who write about the environment.
- Appendix C suggests the types of individuals who might be available for classroom visits as resource persons.

In addition to using the information described in the Appendixes, teachers should note that, to an increasing degree, public libraries are providing booklists, speakers, films, and displays which deal directly with environmental issues.

This publication is, hopefully, a precursor to educational materials which will reflect continuing concern for improving the human condition. It is hoped that teachers will use the material herein, suggest improvements, construct their own materials, and in general, remain concerned and optimistic. We would be encouraged if your reaction to the materials included sending us directly your critique and any original concept, understanding, and activity material you feel prompted to construct.

BARRY W. JAMASON, Chairman
Environmental Curriculum Committee

TED T. GREENDA, Chairman
Environmental Task Force

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Survival

continuing life (or existence) in the presence of difficult conditions... survival depends upon the ability of an organism to adjust to its environment

Survival of an organism depends upon its ability to adjust to its environment. (Each kind of organism represents a collection of adaptations which fit it for survival under a given set of conditions.)

Activity 1

Two weeks prior to a discussion of the environment, plant a dozen flower seeds in healthy soil. When growth can be observed, separate the tiny plants as follows:

- three to remain in the good soil as a control
- three to receive insufficient water
- three to receive no sunlight
- three to be transplanted to sandy soil (deficient in minerals)

Students should compare the growth and appearance of the four groups over a period of time, and draw conclusions based upon their observations.

- What conditions seemed to be most necessary for survival?
- How did the three test groups of plants react to their new environments?

Activity 2

Visit the school lawn or park. Students should look for a plant such as dandelion, chicory, evening primrose, dock, or burdock. Have them compare this plant with the surrounding grass plants. Examine the soil beneath the rosette of leaves. Use a trowel to remove this plant and a grass plant from the soil, insuring that the root system remains intact.

- How does the appearance of this plant compare with the grass plants?
- What is the difference in their root systems?
- What is a tap-root system, and of what advantage is it to the plant?
- What are the advantages of the rosette pattern of leaf growth?
- Given these characteristics, how is this plant well-suited for survival?

Activity 3

This is a lesson in protective coloration. Describe an area roughly 10 feet by 20 feet on the grass surface of the school grounds. Imbed 250 colored toothpicks so that their tops do not show above the top of the grass. Use 50 each of the colors red, blue, yellow, pink, and green. The students can pretend to be birds looking for insects while they try to find as many as they can in five minutes. Ideally, they will locate fewer green toothpicks than any other color.

- Do you think that green insects have a good or a poor chance of being overlooked by birds? Why?
 - What does color do for the insect?
 - How would these conditions be different during the various seasons of the year?
 - What insects and animals have a changed outward appearance at different times of the year? What does this accomplish?
-

Activity 4

Develop a class discussion around the idea that man has been able to observe and copy patterns of nature for protection, comfort, and survival. Ask students to cite simple patterns of animal behavior that man has copied in order to survive. For example, many animals store food for the winter; frogs eat well when food is plentiful and then hibernate at a time when the supply diminishes; certain animals grow thick coats of fur for the winter and shed them as the summer approaches.

- Why do geese fly in a "V" formation? Why do groups of planes frequently fly in a similar formation?
 - Why do beavers build dams? Does man build dams for similar reasons?
 - What are some types of animal behavior that you think man could benefit from by imitating?
-

Activity 5

Instruct the students to pair off. One member of each pair should sit facing the window or some other source of bright light. The other member is an observer. The student facing the light closes his eyes. At a signal from his partner, he opens his eyes. The observer notes any change in size of the pupils of the eyes when they are opened. Reverse the roles of the partners.

- Describe what happens.
 - How does this ability to react to the environment help man?
 - Discuss other instances in which man is capable of adapting to changing conditions in the environment.
-

The basic function of any ecosystem is to capture and transfer energy.

Activity 6

Plant 3 or 4 seeds (bean, pea, or soybean) in each of 3 pots or other containers of soil. Place the containers on a window sill and keep them moist until the plants begin to emerge. As soon

as the soil begins to crack above the seeds place one of the containers in a completely dark place, place the second somewhere in the room as far as possible from the window, and leave the third one on the window sill. Water all three as necessary and observe the growth of the seedlings over a period of 2 weeks.

- What do your observations tell you about the relationship between sunlight and green plants?
- For what purpose is light used by the plants?
- Of what importance is it to you that green plants have the ability to use light?

Diversity is a key factor in the survival of an ecosystem.

Activity 7

In order to begin to develop an understanding of succession, change, and diversity in nature, children should become aware of the variety of living and nonliving things in a particular natural area. Have several groups of children obtain hoola hoops or large loops made from wire hangers. These should be tossed onto the school grounds or on the grassy surface of a park. Each group should then list all the living and nonliving things found within the perimeter of the hoop. (Forest areas, pastures, and lawns can also be used in this manner, and the results compared with the school grounds or park area.) This painstaking count or listing of the things observed in any area gives a picture as unique as any thumbprint and a feeling for the wide variety of things that make up any part of the environment.

- How do some of the living things observed manage survival?
- What are some characteristics which contribute greatly to the ability of an organism to survive?
- How do the nonliving things fit in or affect the lives of the living?

Physical well-being is a fundamental necessity for survival even though man often places a higher value on other things.

Activity 8

Students should gather news articles relating to ailments of human beings which are caused or aggravated by some form of pollution. They might then make a chart which relates varieties of illnesses to types of pollution.

- From this activity, has it been possible to show specific relationships between illness and pollution?
 - What is the fastest growing cause of death in the United States? Why is it?
 - What is necessary to move people to change their living styles?
 - Why does mere knowledge or awareness seem to be insufficient?
-

Man changes the natural environment to the extent that many species find it difficult to adapt to the new conditions.

Activity 9

Study the habits of animals that have been generally unsuccessful in their struggle with man... American eagle, grizzly bear, whooping crane, and the passenger pigeon. Then examine such species as the white-tailed deer, woodchuck, starling, and the cottontail rabbit, all of which have been more successful in man's world. (An excellent reference for teachers using this activity is the article, "Environmental Deterioration and Declining Species," in the August-September, 1970 issue of *The Conservationist*. In addition to the article itself, there are suggestions for class discussion and projects.)

- What are some apparent differences in the habits of these two groups of animal species?
 - Why are the endangered species worth saving?
 - If the cottontail rabbit became extinct, what do you think would happen to the natural community which it inhabits?
-

Activity 10

Obtain from the New York State Department of Environmental Conservation a description of a state wildlife refuge (e.g., Montezuma) or a forest preserve. Describe this park to the students as an example of a natural community. Propose to them that man be introduced into the community.

- What would man's first actions likely be?
 - Why would these be compatible or incompatible with the existing ecological balance in the community?
 - Suggest what man would need to give to the community and what he could take from it if the balance were to be maintained.
-

Activity 11

Have the class develop a bulletin board display which illustrates various types of environmental changes. The class may be divided into two groups; the first to work on environmental changes

caused by nature, and the second to work on environmental changes produced by man. The students may contribute such examples as: weather, woodland succession, land-fill areas, population, reforestation, housing, and wildlife.

As part of the display, ask students to bring to class current newspaper and magazine articles that relate directly to current environmental changes. Some members of the class may be encouraged to produce simple drawings which depict various types of environmental changes shown in the display.

As an extension of this activity, ask a group of students to set up a supplementary display that would include some examples of environmental changes that they think will take place in the near future. Develop a class discussion around ways of preventing or at least reducing the future environmental changes suggested by the students.

- Explain how some animals have become extinct because of man's influence.
- Explain how some animals have become extinct as a result of natural causes.
- Why are environmental changes taking place faster today than in years past?
- What are some ways in which man can help animal and plant life adjust to environmental changes?
- What happens to the balance of nature when a specific plant or animal becomes extinct?
- Why are some types of plants and animals able to adapt to changes in their environment while others are not? Give examples.

Interdependence

mutual reliance...
an organism cannot live alone

Living things are interdependent with one another and with their environment.

Activity 1

Set up a terrarium simulating a woodland, bog, or desert environment.

Have students observe and record as many examples of interdependence in the community as possible, being specific as to why one organism is dependent on another.

Ask for hypothetical situations which suggest any of a number of "upsets" that could occur to the balance of the community.

- What would be the effect of too many plants on our environment?
 - What problems would be created by the overabundance of one type of insect in our environment?
 - How would a substantial decrease in sunlight harm our environment?
 - How would you personally be affected by a lack of water?
-

Activity 2

Have the children prepare a brief report describing the result of any example of man's intrusion into the natural environment... removal of trees or bushes, tilling the soil, cutting grass, or spraying insects. Have them prepare a second report describing its natural balance.

- Could one tree be cut down without harmful consequences? Several trees? All of the trees?
 - Are man-made changes ever, always, or never justified? Why?
 - What would happen if one form of life was completely eliminated from the earth?
 - How does man often change nature without realizing the full impact of his actions? Should he?
-

Activity 3

Students should compile a list of articles or products which are commonly used. Direct them to trace each item from its finished, usable state, back to its origin. For example:

egg → supermarket → wholesaler → farmer → chicken → grain → soil

baseball glove → store → factory → tannery → slaughterhouse → cattle ranch → steer → grain and grass → soil

- How many of the items can be traced back to the soil?
- Which other components of the environment rival soil in importance? (air, water, light) How?
- Are there any articles which you cannot trace back to the earth? If so, isn't there an indirect relationship to the soil (e.g. dependence of the laborer upon the soil for his food supply) at some essential point along this path that has been traced?

Activity 4

Illustrate our dependency upon the soil and plants by having students list all the uses we have for cotton cloth. Other plants or plant products might be substituted for cotton to expand or repeat the activity.

- What benefits do we derive from cotton?
- Are we dependent upon cotton for survival?
- If our supply of cotton were threatened, what substitute could we make for the protection it affords us?

Natural resources are unequally distributed with respect to land areas and political boundaries, and the use or misuse of them affects others.

Activity 5

Prepare a large outline map of the world, and mount it on the wall. Have the students list all the raw materials required to build an automobile and indicate which continents produce these materials. On the map, mount a small model auto at the site of Detroit. Using a different colored flag for each resource, pinpoint its primary source of supply. Connect each flag to Detroit by means of brightly colored thread or yarn.

- What raw materials are required to build an auto?
- How many continents (and countries) are involved in supplying these raw materials?
- What must be done to prevent the exhaustion of these resources?
- What other related industries contribute to the production of autos?
- Make a chart of auto production figures for several years. What does this information tell you about resource use?
- What will happen if and when other countries begin making as many autos as the United States does now?

Activity 6

Assign students the task of listing 10 major imports and 10 major exports for each of 3 countries including the United States. The information obtained should then be featured in chart form, showing the sources of all these traded products. A few of these interrelationships could be illustrated by using a world map and connecting the trading nations with thumb tacks and colored string. Discuss the diverse nature of the goods traded, and their importance to the nations which buy them.

- Why do countries import goods?
- What responsibilities do nations have to each other in international trade?
- What could a country do if certain raw materials or manufactured goods were no longer available from other countries?

The energy requirements of man are met primarily by "food," and men are dependent upon other organisms through food chains and food webs.

Activity 7

Using pupils to represent the components, construct models of two or three simple food chains, and then convert them into a food web.

Prepare a set of 6"-x 12"-cards lettered with such labels as Soil, Green Plants, Mouse, Grasshopper, Earthworm, Snail, Frog, Shrew, Robin, Garter Snake, Rabbit, Owl, Fox, Goldfinch, Sparrowhawk, etc. Prepare enough cards to supply about half the class; let the other half serve as an audience. You will also need a ball of string which can be cut to convenient lengths and used to connect the "links" in the food chains and web.

Assign a card to each pupil. Starting with Soil, connect it to Green Plants by asking the two pupils to hold a length of cord between them. Next connect one of the herbivores to the Plants; follow this with a carnivore linked to the herbivore. At first the components will depict simple food chains, but as more and more components are added, cross-links begin to be evident and the food web concept is easily developed. At the outset, it is advantageous to place the pupils representing soil and plants centrally, and then allow the remainder of the web to develop around them.

- Why is soil necessary for all life?
- What is the source of food used by animals?

- In a natural environment, if all the members of a particular species, such as grasshoppers were removed from the food web, what would be the effect? This point can be emphasized by removing the appropriate pupil from the model.
 - In a natural community, what would be the effect of removing all predators (insect-eating birds, foxes, etc.) from the food web?
 - How would an increase of predators affect the food web?
 - As part of a food web, how does man differ from all other organisms? (Make sure students realize that man attempts consciously to manipulate the components which make up the web, and that man alone has the ability to understand the complex interdependencies and therefore has the obligation and responsibility to preserve the balance of the whole web.)
-

Activity 8

Have the students make lists of the foods they ate during the previous day. The list should be detailed and it should include every type of food product used. Direct the discussion so that man's dependency upon the environment will be demonstrated.

- What plants or plant products are included in the list?
- What animals provided the meat foods?
- What do these plants and animals need to survive?
- Are any of your food sources threatened by pollution?
- Are the sources of food for plants and animals themselves in any way threatened?
- If these food sources are in danger, what will happen to man?
- What can man do to protect his food supply?

Scarcity

smallness of quantity in relation to needs...
as populations increase, competition
for resources necessitates the establishment
of priorities

An understanding of scarcity is necessary to our understanding of the environment.

Activity 1

Ask a group of students to obtain and bring to class labeled samples of each of the following:

coal	sulfur
wood	iron
pyrite	lead
oil	
building stone (granite or marble)	

Have these students present their samples and ask the rest of the class the questions below.

- What are the sources of these materials?
- Place the samples in the order of their economic importance. Then, place them in the order of their availability. What information do you now have about these materials?
- What is the relationship between availability and economic importance or value?
- What could happen to the world's economy if most of these materials became very scarce?
- How may these materials be conserved?

Some parts of the natural environment are either difficult to replace, or are in fact irreplaceable.

Activity 2

Have the students make maps which show the locations of the world's major mineral resources.

- What is a resource? A natural resource? A renewable resource?
- Why are mineral resources considered nonrenewable?
- If water and soil are renewable, why are we concerned about them?
- For which minerals, if any, do satisfactory substitutes exist? Are these substitutes mineral resources?
- What adaptations by man may be necessary when certain mineral resources are exhausted?

Activity 3

Place a large sign on the chalkboard which states, "LAWNS MAY NOT BE WATERED FROM 7 A.M. TO 9 P.M." Devise other signs for placement around the room which deal with the scarcity of pure water. Take advantage of the students' curiosity by asking how many of them have seen similar signs. Discuss the significance of posted notices such as these. Direct the discussion to related issues of water use, such as the sale of drinking water, local ordinances, and the condition of local water supplies.

- Why, in a state with numerous bodies of fresh water, do many people find it necessary to buy drinking water?
- What habits and practices of man contribute to the pollution of our water resources?
- What could be the result of our failure to act quickly enough to prevent wholesale water pollution?
- How does increasing population affect the existing problems of water supply?

Activity 4

Soil is one of our greatest natural resources. Each year, thousands of acres of rich soil are lost to agriculture because of erosion. Discuss the various forms of erosion with the class, mentioning at the same time, the benefits of soil conservation practices. Have the class construct a simulated example of water erosion taking place. Use a large, rectangular, metal or metal-lined pan which is several inches deep and has a screened opening at one end. Deposit a layer of soil in the pan. Elevate the unscreened end of the pan and pour water over the soil. Measure the amount of soil lost through the screened end. Find the relationship between slope (degree of elevation) and the amount of erosion by repeating the experiment with the box held at varying angles.

- Is the effect of wind on soil the same as the effect of water on soil?
- What solutions can you devise for the problem of soil erosion?
- What farming practices must be changed to help solve this problem?

Natural resources, in terms of both quantity and quality, are important to all living things. As population increases, competition for use of these resources increases, resulting in a need for establishing priorities.

Activity 5

Have the class list all the ways in which people use water. From this list of uses, ask the students to estimate an individual's daily water consumption in gallons. Multiply the estimate by 365 days and then multiply this product by the population of the United States. (Point out that this total is only a portion of all water used, since it does not reflect industrial uses of water.)

- What is the source of water for your village or city? For your school?
 - Is this supply endangered? Is it limited? If so, how, and what can the community do about it?
 - What factors will determine the amount of water used in the future?
 - How can we assure a sufficient water supply for future generations?
-

Activity 6

Ask a group of students to prepare a report which would include: the major uses of water, the major supplies of water, the major pollutants of water, and the major methods of water purification. At the end of a specified period of time, have the students present a chart to their classmates showing the results of their study. Ask the class members to supply additional information in the various categories. The original group may wish to revise the chart and make a permanent one for easy classroom reference.

- How does ground water contribute to the spread of pollution?
- How do streams contribute to the spread of pollution?
- What are some of the main factors that affect the water supply in your community?
- What limits the amount of water which sinks into the ground?
- Define water pollution and explain how it occurs.
- What is the relationship between the depth of ground water and the degree to which it is polluted?
- What are some ways in which a polluted body of water may be restored to a potable condition?

Recyclément

continuous feedback for reuse...
man would do well to observe nature's
example and reuse the results
of his technology

In nature, there is a continuous recycling of many elements.

Activity 1

Turn on a water faucet and permit the water to flow into the drain. (This action may be merely described, not done, if there is no faucet in or near the classroom.)

- Where does the water come from?
 - What is the source of the school's and the community's water?
 - How is this water supply replenished?
 - Where does the water go after it passes through the drain?
 - Diagram or describe the cycle that the use of this water creates.
-

Activity 2

Have the students learn about nature's water cycle via the following demonstration:

Place some crushed limestone rocks on the bottom of a large jar or an empty aquarium. Add a 3-inch layer of soil on top of the limestone and plant some living moss or fern. Moisten the soil with water. Finally, place a piece of glass over the top of the container. After several days, observe droplets of water clinging to the sides and the top of what is now a terrarium.

- Where did the water come from?
 - How did the water get on the sides and the top?
 - Why is it necessary to add water to a terrarium?
 - How does this experiment illustrate the water cycle in nature?
 - How do you think the increasing concentration of pollutants in the atmosphere affects the water cycle?
-

Man would do well to observe nature's example and recycle the results of his technology.

Activity 3

Display in the classroom examples of our modern, throw-away containers; a soft drink can, a soda bottle, and a cardboard milk container. Have the students discuss what happens to these articles after they are discarded. Emphasize for the class that nature has its own recycling process in that materials, in one form or another, are used over and over again. Man uses many things only once and then discards them, often in a nondegradable form.

- Why do our products seldom come in reusable containers any more?
 - Of what materials are reusable containers and discards made?
 - Do these materials readily return to their sources?
 - How are we hindering nature's process of recycling?
 - How can man reduce the amount of waste he produces?
 - What can individuals do to limit waste?
-

Activity 4

Lead a discussion of the meaning of recycling. Ask students to bring to class articles, pictures, or models of things in our environment which can be and have been recycled. Some examples are:

- junked cars → scrap steel
 - used newspapers → clean newsprint
 - bottles → returned for reuse
 - cans → reprocessed tin and aluminum
 - trash → glass tubing, building tiles
- Why do both rich and poor societies need to recycle the results of their technology?
 - What is "planned obsolescence?"
 - How can we encourage and take advantage of our "trade-in" practices (e.g., used cars for new ones, etc.) with retailers as a means of promoting one form of recycling?
-

Activity 5

Select class members who will write to paper manufacturers requesting the following information:

- when newspapers and magazines are reused or recycled, what amount of this scrap paper is equivalent to the usable portion of the average tree felled for paper production?
- what percentage of scrap paper waste is used for this purpose today?
- is there a potential for greater scrap paper use in the paper industry?

Once the answer to the first question is determined, have students begin collecting magazines and newspapers until the necessary amount has been obtained. If this amount would seem to be unwieldy, work with a fraction of the amount. When the point has been demonstrated, the papers may be sold to a scrap dealer. Discuss the problems of collecting and disposing of waste paper.

- What does your family usually do with waste paper?
 - Could you just as easily give the paper to a collector as to dispose of it in the manner you presently use?
 - If it is inconvenient to do other than include it in the trash pickup, how important is the inconvenience?
 - How much is waste paper worth to those who collect it and resell it?
 - How would we benefit from having a much greater percentage of the waste paper reused?
 - Are trees a renewable resource? Why should we be worried about the depletion of our forests?
-

Activity 6

Organize a class-sponsored cleanup of the school grounds. After the students have participated in this anti-litter campaign, have them compile a list of the common forms of waste found, and discuss how this litter could have been reused. A number of manufacturers are offering bounties for their containers when returned in quantity after use. An interesting project might be to contact one such company, learn the details, and embark on a moneymaking venture by collecting these containers for cash. Profits from this effort could be used to sponsor a modest community environment improvement plan.

- Why do people litter their environment?
 - Knowing this, are there any ways we could convince the community of the need to abandon this style of living?
 - How does government (local, state, federal) attempt to control littering?
 - How successful are these measures? What could be done to improve them?
-

Activity 7

Classroom wastes might be classified as organic or inorganic. Students should distinguish between the two types and, for a week, make a list of each kind found in the classroom at the end of the school day.

- What changes in organic matter in a compost heap occur under "proper" conditions?
- How do conditions in a compost heap transform organic matter into fertilizer?
- What is humus, and how is it formed? Of what value is it to man?

- Garbage is, for the most part, organic waste material. How would a hermit most properly dispose of his garbage?
 - The hermit's solution to the disposal problem is obviously unsuitable for use in urban communities. Explain.
 - How may large urban centers dispose of waste safely and healthfully?
 - Why are strikes by sanitation workers especially serious examples of work stoppages?
-

Activity 8

Organize a class contest in which students may take part in developing new methods of disposing of waste materials. As part of the contest, the students may design new forms of packaging materials. At the end of the contest period, display the students' efforts and ask the class to develop criteria for determining the best entries and judging the winners.

- How did the Indians dispose of their waste materials?
- How did Americans in Colonial times dispose of their waste materials?
- What were the consequences of the ways in which the Indians and early Americans disposed of their waste materials?
- How does affluence affect the type and amount of waste materials?
- What are some of the most modern methods used to dispose of our waste materials?
- How does the operation of incinerators affect our environment?
- How do land-fill areas detract from our environment?
- How could families reduce the amount of garbage they create each day for a week?

Right vs. Responsibility

satisfying the requirements of suitability
or convenience vs. accountability...
man has exercised his right with little regard
for his responsibility to the environment

Man has exercised a presumed right to exploit the environment with little regard for his responsibility to preserve it.

Activity 1

Using a United States map, outline the major oil fields or beds within the territorial limits of the United States. Then review the meaning of the continental shelf and explain that oil drilling is possible in these shallow ocean areas. Indicate where offshore drilling is now occurring.

Use some recent *Life* magazine articles to show some of the consequences of oil slicks from offshore spills.

- "Dirty Dilemma of Oil Spills," *Life*, LXVIII, No. 8, (Mar. 6, 1970), pp. 28-35.
- David Snell, "Iridescent Gift of Death," *Life*, LXVI, No. 23, (June 13, 1969), pp. 22-27.
- Jordan Bonfante, "Oil in the Arctic," *Life*, XLVI, No. 6, (Feb. 14, 1969), pp. 20-29.

- How do oil companies gain the "right" to drill offshore?
- What responsibility do the oil companies have to society and the environment?
- Why were people very concerned when oil companies asked for the right to drill in the Great Lakes?

Activity 2

Invite a school administrator and the head custodian to speak to your class on air pollution as it pertains to the effluent of the school's heating plant. Try to arrange a tour of the heating plant area in the school.

- Does the school heating plant contribute directly to air pollution?
- Are any anti-pollution devices being used? What are they?
- What type of fuel is used by the school?
- Do the school buses contribute to air pollution?
- What attempts are being made to curb it?
- What is the school's responsibility as a community institution in this regard?
- What are the taxpayers' (parents') responsibilities as supporters of the school?

It is the responsibility of each individual to become aware of existing governmental regulations intended to protect the environment.

Activity 3

With your class, plan a school or grade-level assembly at which a concerned public official would appear to discuss existing and needed anti-pollution measures. Prior to the assembly, distribute ditto materials to the student body which explain some of the aspects of environmental abuse. A public official such as a town engineer, New York State Health Department representative, or a staff member from the Environmental Conservation Department would be able to discuss with the students a wide range of environmental concerns. You might choose a topic which is of particular local or regional concern; water supply; air pollution; waste disposal; and the rise in use of chemical fertilizers and insecticides.

- Why must we as members of the community know what can be done about pollution?
- As a student, what is your responsibility to the environment?
- What can your family do to help environmental conservation?

Activity 4

The electric company wants to build a facility on the only available land in a particular area. In order to secure this land, it must present its case for placing the plant in a wildlife section. The local conservationists oppose the project and will present their reasons for their opposition. Some students can write to the electric company and ask them how they select sites for plants and what benefits these plants bring to the community that outweigh the destruction of more of our natural environment. Other students can find out how conservationists go about arguing for the preservation of our natural environment. The rest of the class will act as the town officials who have the power to grant or deny the company's petition. This might be set up as a panel discussion.

Consider the advantages for having the new plant:

- As the community grows, the supply of electrical energy must keep pace.
- Jobs will be provided.
- The plant will provide additional tax money for the community.

Consider the disadvantages in having the new plant:

- A wildlife and nature area will be destroyed.
- Camping, picnics, and fishing no longer can be enjoyed by the community.

- Does the electric company have a right to build its facility no matter what the cost is in terms of injuring the environment? Why?
 - Do you have a right to the comforts available from the company's operation (heat, light)? Why?
 - What is the company's responsibility if it exercises a right to build and to produce electrical energy?
 - What is your responsibility as the receiver of the company's product?
-

Activity 5

Discuss the state of our environment with your class. Then, in order to learn what members of your community know about types of pollution and their controls, have your class conduct a survey. The students should compose a set of interview questions and use them with parents, teachers, public officials, and community residents. Each interview should probably not take more than 5 minutes. If yes-no and true-false questions are used, it will be relatively easy to get responses tallied and draw some conclusions.

- How well-informed is your community?
- What can be done to increase the information the community has?
- Did the people you interviewed seem to feel a responsibility toward the environment? Explain.

Planning

detailing a program of action...
decisions concerning the future must be
based on long-term environmental benefits

Decisions concerning the future must be based on long term environmental benefits.

Activity 1

Using the school building and homes as examples, students should list and describe the things that man has done to alter the natural environment. (Air conditioning, heating, lighting, construction projects, etc.) The list may be expanded to include changes beyond home and school.

- Are these alterations beneficial to humans?
- What indirect or long range consequences have we caused to take place?
- What are some of our plans for the future which require manipulation of the environment?
- Can we completely control our environment? Should we? Why or why not?

Activity 2

Study and discuss the effects of damming rivers and streams. Build a model dam in the classroom using a stream table or a similar arrangement. If a small stream is available on school property, use it to demonstrate the effects of damming. The Rogers Conservation Center in Sherburne, New York has an excellent model stream display which illustrates natural and manmade forms of stream flow regulation. Emphasize the following ideas during this study:

- water velocity is altered
- the temperature of the water is affected
- the erosional process is changed
- animal life in the stream is influenced
- Why do we build dams?
- What are some of the detrimental consequences of dam building?
- Is it possible to do without the dams we have? Explain.
- How may we reduce the number of harmful results of dam

Activity 3

Ask a group of interested students to propose a design for a new city. Have the entire class contribute ideas regarding the most important factors to be considered in building a new city. Include such factors as water supply, available transportation, and economic opportunities. Some members of the group will be interested in making scale drawings showing the layout of the total community.

- What are some of the most difficult problems to solve in today's cities?
 - Why is a good water supply so important?
 - How can the natural beauty of a city be preserved?
 - What agencies other than the schools should be included to contribute to a good community education program?
 - Why is it so important to control vandalism in the cities?
 - What helpful information could be obtained from a person who works in a city planning organization?
-

Man alters the options available to future generations when he unwisely manipulates the natural environment.

Activity 4

Visit a housing project which is currently under construction, or a road-building site. This may be done as a class field trip or students may be encouraged to visit these sites on their own.

- Why is this project necessary?
 - What conditions would have to be changed to eliminate the need for this construction?
 - What was the area like before construction began?
 - How were decisions made about need, location, and extent of the project?
 - What effect will the construction have on this area and its environs?
-

Activity 5

Prepare a bulletin board using the Florida Everglades as the subject. This tract is dependent upon runoff from surrounding areas to maintain its water level. Its future existence is being threatened by the proposed construction of a jetport. Discuss the effect of such a project on this natural community. The June 1970 issue of the magazine, *Smithsonian*, has an excellent article on the Everglades.

- Marquis Childs, "The Everglades in an Era of Reprieve, But Concern," *Smithsonian*, I, No. 3, (June 1970), pp. 4-13.

- Describe the water conditions which are vital to the life of the Everglades.

- List the advantages for maintaining the Everglades and the advantages of a new jetport for this area.
- How can we make a decision about the relative importance of a jetport and a natural community like the Everglades?

Environmental quality must be maintained as population increases and the available space per individual decreases.

Activity 6

Suggest that students get information about the national and State park systems and their purpose by writing for free copies of:

- *Outdoor Recreation Map of New York State*
New York State Environmental Conservation Department
Albany, New York
- *National Parks*
National Park Service
United States Department of the Interior
Washington, D.C.

- Describe the various types of state and national parks.
- Why have they been developed?
- How are the sites selected?
- How are these efforts financed?
- Why are parks and other recreational facilities becoming increasingly necessary?
- Would federal or state governments be justified in taking, with "adequate" compensation, private lands and making them available for the enjoyment of the general public?

Man's efforts at changing the environment to fulfill his needs are often beneficial to him but harmful to the environment.

Activity 7

Build a stream table (a box about 6" to 8" in depth, 4' to 6' wide, 6' to 8' long) and line with heavy aluminum foil. Divide the table into two halves and fill both with dirt about 4" to 6" in depth. Students may now attempt to solve problems in land management. Some suggested situations follow.

Create a hill in each section. In one section "plow" the hill up and down, in the other section "plow" the hill across. Using a sprinkling can, water the hill from the top.

- Which type of plowing is best?
- What evidence can you give to support your theory?

Create a hill in each section of the dirt table. Dampen each hill. Sprinkle grass seed on one hill. Allow the grass to grow. Water the hills.

- Which hill holds the soil better?
- What evidence can you give to support your theory?

Create streams (a piece of rubber tubing from a faucet will supply water).

- What is a delta?
- How does it form?
- What does the presence of a delta tell you about the stream?
- What is a flood plain?
- Is a flood plain helpful or harmful to the land? Explain.

Make a straight flowing stream and a stream with dams. Add dye (food coloring).

- Which stream cleans itself faster? Why?
- How is this related to pollution?

Valuing

assessing relative worth or importance...
man is endangering his chances
for a better life through the very measures
he employs to achieve it

Man currently faces the prospect of endangering his chances of a better life through the very measures he employs to achieve it.

Activity 1

Suggest to students that over a period ranging from 24 hours to several days they must plan their own personal living patterns in such a way that each will in no way contribute to further degradation of the environment. The student must function "normally," yet must live within the particular framework he establishes for himself over this given period of time without damaging the environment. Imaginative students should be able to find ways to meet most of their needs.

Perhaps this activity should be one of graduated difficulty moving from the least difficult to the most difficult. For example, begin by pledging that no student participating will in any way use a vehicle powered by an internal combustion engine, or use food which comes in nondegradable containers or wrappers. A more difficult project might be to function for a day without using any electrical energy. In order not to make this activity into an experience likely to be ridiculed, care should be taken that students try to develop practical alternatives to what they are giving up or not doing.

A film on new developments in transportation which are less harmful to the environment might be good to show in conjunction with this activity.

- What one thing you "gave up" did you miss the most? Why?
- Did you find your pattern of life hampered by inconveniences during this period? In what way?
- Would you be willing to learn to live differently in an effort to preserve our environment? Why, or why not?

Activity 2

Place one goldfish in a small aquarium or other suitable container. Add a few drops of liquid detergent. The goldfish will become listless and gulp the air. Return the goldfish to clear water.

- What is the source of the detergent in rivers?
- Why have detergents become increasingly dangerous to the environment?
- Is there any limit to how efficient we can make detergents in terms of their cleaning power?
- As we improve the cleaning agents, what do we sacrifice?
- Are "whiter than white" clothes part of a better life?

- Should we be content with the choice that has been or is being made? (i.e., "whiter than white" clothes, and a poisoned environment, or...)

Activity 3

Ask the students to go shopping with their mothers and note the kinds of containers used for soft drinks. Also, have them count the number of different types of soft drinks. (This could be committee work.) In the classroom, make two charts and list all the soft drink brands available in returnable containers and all those available only in disposable containers. Have some students interview store managers about why so few returnable bottles are stocked.

- Why have disposable bottles become so popular?
- How are they presently disposed of? Is this wasteful?
- What problems does this create?
- Would it be possible for us to have only reusable containers for beverages? Would it be very inconvenient?
- Why is it worth some inconvenience to eliminate this problem?

Individuals (and because of them, industry) tend to select short-term economic gains, often at the expense of greater long-term environmental benefits.

Activity 4

Have students learn something about the methods currently employed by farmers, loggers, miners, well drillers (oil), and building contractors. Develop their understanding of these practices through films, filmstrips, and guest speakers whenever possible. Then have the students catalog the disadvantages of this type of resource mismanagement wherever it is evident.

- Why do these industries use the practices we find so harmful to the environment?
- What will be necessary to change these practices on a wide scale?
- Even if we can change these conditions, is it too late to correct any or all of them? Why, or why-not?

Devise specific questions for each of the industries named above:

- How much of the earth's surface is suitable for farming? What does this information tell us?
 - How long does it take for an inch of topsoil to form?
-

Activity 5

Present the following short narrative to the class:

You and your wife live in a new home on property adjoining a refreshing lake. In the valley town below live your parents and many friends. You have happy memories of your childhood spent there, and, as you watch the village children playing in the stream that flows down the hill from your lake, you recall how pleasant those moments were for you on hot summer days.

This memory is more vivid now that a mining company wants to buy part of your hillside and the lake. There is a strong possibility that the company's operations would pollute the lake and stream. This would be resented by the townspeople, most of whom are your friends. Additionally, many families use the stream for drinking water when their wells get low. However, from your point of view, the sale of part of your property would permit you to pay the balance of your mortgage and provide some welcome extra cash.

Ask the students to react to the situation orally or in a written assignment. Following the discussion, you might change the situation so that selling the hillside and the lake becomes more of an economic necessity. It would be interesting to note whether or not the students' points of view change. To extend the activity, have students compose situations which require that similar choices be made.

- Do you have an obligation to the townspeople? Explain.
- Are these obligations more important than providing financial security for your family?
- What are the responsibilities of the mining company?
- How will you resolve this dilemma?

Activity 6

Have a group of students list the major materials used for building in their locality and have them identify examples of structures constructed from each of the materials. Also, have them give the approximate dates the buildings were constructed and identify the sources of the building materials.

Ask a second group of students to collect samples of the raw materials used in these constructions. Test for the difference in durability of the materials by exposure to heat, the effect of water action, and the results of friction. Other information about the materials can be obtained from library references, a local Public Works official, and through interviews with local building contractors.

- What building materials were imported? Why?
- What are the most commonly used building materials in your area?
- How does climate affect the use of building materials?
- Why are some materials much more durable than others?
- What are some ways in which man can increase the durability of natural building materials?
- What are some ways in which he can improve upon the natural beauty of these materials?
- List the strengths and weaknesses of the five most commonly found building materials in your community.
- What are some ways in which man can conserve the source of natural building materials?
- What do we sacrifice in our efforts to provide mass construction at low cost?
- Do we have any choice other than to proceed as we do now in our construction industry?

Art can be an expression of an individual's feelings about his natural surroundings.

Activity 7

Conduct a class exercise in which each student develops an artistic representation of his feeling for his natural surroundings. These feelings may be expressed as a painting, a poem, a model, or as a work of prose.

- How does this creation represent your feelings?
- How will man fare in a world increasingly technological and materialistic?
- Will art forms become an escape from this world or a means of improving it? Why?

Social Forces

agents of change in society...
society must be moved to insure the
preservation of the environment

In order to preserve our threatened environment, present attitudes must change to reflect a widespread public concern which will encourage protective action by individuals, groups, and government.

Activity 1

Obtain the following film for use in your class:

Tom Lehrer Sings Pollution (3 min., B/W. Free. Public Health Service, Audio Visual Facility, Atlanta, Georgia 30333.)

Preview this film which vividly portrays the various forms of pollution in our environment. Jot down the lyrics for students and ask for a reaction to them. Show the film.

- What is Tom Lehrer's attitude toward the pollution problem?
- How does Tom Lehrer feel about the way the country is moving to correct the problem?
- To whom is he directing his music?
- Give students an opportunity to write their own lyrics about the pollution problem.
- Consider how Tom Lehrer might react to a community allowing a major producer of industrial waste to locate in that community.
- Is this a convincing way to present a problem or issue for discussion?
- What are the advantages and disadvantages of such a presentation?
- What should be our attitude toward the pollution problem?

Activity 2

To give immediate purpose to learning how to write letters, have children send letters to their State and local government representatives urging them to pass or at least support strong laws designed to protect the environment. The children learn letter-writing and with parental signatures on these letters, the legislators will know that the public wants something to be done.

- What legislation designed to protect the environment is presently before State and local governments?
- Do you feel your State and local governments are doing enough to protect the environment? Explain.

Activity 3

After a discussion of pollution and conservation, have a poster contest. Include as many classes in this activity as possible,

and invite administrators and other teachers to judge the posters on the basis of creativity and the message conveyed. Ask local stores to display the winning posters.

- What is meant by conservation of natural resources?
- Why is conservation everyone's concern?
- What specific role can you as a student play in the pollution prevention program?
- Why should individual citizens be well-informed about major resource issues and problems, and about ecological principles.

Activity 4

Ask the class to assist in devising a chart that will show the economic, social, and political consequences of each of the following problems:

- water pollution
 - air pollution
 - loss of recreation areas
 - loss of large wooded areas
 - loss of large numbers of wild animals
 - loss of varieties of plant life
- What are some organizations whose main effort is to preserve wildlife? Give some specific examples of their programs.
 - Under what conditions do animals become extinct? Explain how man could help to prevent this.
 - Why is the decrease in bird population in some areas causing a drastic change in the plant environment?
 - What type of organization could you establish in your school to aid in the protection of the local bird population? What would be some responsibilities of members of this group?
 - What are some of the short-range advantages of protecting wildlife?
 - What types of long-term plans must be made to assist in the conservation of natural plant and animal environments?
 - How could you, as an individual, explain to a friend the importance of preserving a wildlife environment (natural community) that you know about?

Activity 5

During the 1930's the Federal government established the C.C.C. program primarily to solve an unemployment problem. The efforts of this organization were basically conservation-oriented.

Ask a group of students to prepare a brief report on a number of specific activities performed by the C.C.C., and have them show how each activity actively aided the conservation program.

Ask another group of students to create and name a new conservation minded organization (Federal, state, and local) naming specific tasks and indicating how each would advance the cause of conservation.

- Why should the individual be concerned with helping the Federal, State, and local governments support programs conservation?
- Give some examples of some small-scale conservation problems and indicate how each might be solved with the assistance of local government.
- Give some examples of large-scale conservation problems and indicate how each might be solved with the assistance of the Federal government.
- Over what types of conservation problems could the State government exert the greatest effective control? Explain how this might be done.
- Explain one way you might change the attitude of one of your friends who is wasteful of a natural resource. Outline the specific steps you would follow.

Activity 6

Organize a mock trial in which "Mr. Santa Barbara Fisherman" is pressing charges against the Union Oil Company which allegedly has threatened the fishing industry as a result of its offshore drilling operations. In preparing both sides of the case, remind students to consider the economic, political, and social implications. Be sure to have students observe the emotional reactions demonstrated on both sides. Stress the need to present both positions in a well-organized fashion. After the "trial" has taken place, ask each member of the "jury" to give a clear and logical statement as to why the Union Oil Company was found guilty or not guilty.

- What are some ways in which the oceans are becoming polluted?
- How is this pollution affecting the ocean environment?
- What are some ways in which man will suffer as the oceans become more polluted?
- What steps has the Federal government taken to eliminate pollution and destruction of our ocean beaches?
- Explain whether or not penalties are a good solution to the problem.

- How can citizens help the Federal government in solving this type of pollution problem?
- What is the effect of oil wells on the adjacent communities? Give some specific problems that may result in these communities if remedial steps are not taken soon.

Activity 7

Have students keep notebooks for one week in which they record the following as a result of observation of the environment:

- kinds of pollution
- sources of pollution
- methods for controlling pollution

The information obtained can be prepared in chart form, and presented along with a series of imaginative, student-designed posters. Collectively, these materials would advertise concern for the problems of pollution. The chart, posters, pamphlets, and ditto materials should illustrate such ideas as:

- automobiles contribute heavily to air pollution
- air pollution is a health hazard
- pollution will affect, negatively, man's way of life
- we must continually strive to curb and eliminate pollution

Some questions for guiding the information-gathering activities of the children can be found below.

- What is the composition of clean air at sea level?
- What change takes place in the composition of air as one goes from sea level upward into the atmosphere?
- What are the main pollutants of the atmosphere?
- Can you smell all air pollutants?
- What are some reasons why the air above cities is more polluted than air over the open countryside?
- To what extent can an individual prevent air pollution?
- What are some steps your government (local, State, and Federal) could take in fighting air pollution?
- What steps could large industries take to stop pollution?

Optimism

anticipating the best possible outcome...
man has the capacity to make this the best
of all possible worlds

Man has the ability to make this the best of all possible worlds.

Activity 1

Conduct a brief discussion about what man has done to his environment through deliberate destruction, apathy, and ignorance, and what he proposes to do in the future to correct his mistakes. Then, with the discussion as a background, conduct an essay contest on the topic, *What the Future Holds for Mankind*.

Arrange for some kind of recognition of the winning essayist.

- What role does the written word play in the battle to protect man's environment?
-

The arts seem to aid man in feeling a oneness with nature and with fellowmen.

Activity 2

Bring to the classroom nature pictures representing the four seasons. Using these as motivation, have the children use poetry to create a feeling of oneness with nature and its beauty. (Japanese Haiku might be one style to use as an illustration.) Suggest that students write about some small marvel of nature that impressed them at a particular time or season. They may illustrate their poems if they wish.

- Can words really capture the beauty of nature? Discuss.
-

Opportunities have been provided for man to experience and enjoy nature.

Activity 3

Have the students prepare a list of State and local recreation areas. They may write to the New York State Environmental Conservation Department, Division of Lands and Forests for printed literature. From this literature have them write brief summaries of the appealing aspects of these various parks. Ditto their comments and distribute them throughout the school. This activity will not only make them aware of the abundance of parks, but will also show how our State and local governments are working to preserve nature for their use. Try to arrange a class field trip to a nearby State or city park. If this can be done, the following questions might be used to stimulate discussion.

- What aspects of the area visited did you find the most appealing? Why?

- What were the noticeable efforts on the part of the government agency to preserve nature?
 - What suggestions can you make that might contribute to the preservation of our natural environment?
-

Although much needs to be done to improve and preserve our environment, we must stop occasionally and acknowledge the gains that are being made in these directions.

Activity 4

Have students cite examples of current environmental improvements and preservation already completed or in progress. Sources for these examples may come from personal observations, newspaper and magazine articles, and television and radio reports.

- Why is it necessary to be concerned with positive results as well as the tasks that must be accomplished?

Appendix A

Environmental Education: Subject Headings

Adaptation (Biology)
Aeroplanes. Noise
Air. Pollution (or Air pollution)
Air Purification
Automobile exhaust gas
Birth control
Cities and towns. Growth
Cities and towns. Planning
City noise
Cleaning compounds
Community development
Conservation
Conservation education
Conservation of natural resources (or: of resources)
Detergent pollution of rivers, lakes, etc.
Disinfection and disinfectants
Dust
Ecology
Environment
Environmental For example: Environmental health, policy,
education, etc.
Factory and trade waste
Forests and forestry
Human ecology
Hygiene. Public
Insecticides
Jet planes. Noise
Man. Influence of environment
Man. Influence on nature
Marine pollution
Marine resources
Natural resources (with subdivisions)
Nature conservation
Noise (with subdivision - example: Noise. Physiological effect.)
Noise control

Odor control
Oil pollution of rivers, harbors, etc.
Pesticides
Pesticides and the environment
Pollution
Population
Radioactive fallout
Radioactive pollution (or contamination) of water; the sea;
the atmosphere
Radioactive waste disposal in rivers, lakes, etc.
Radioecology
Reclamation of land
Refuse and refuse disposal
Sanitary engineering
Sanitation
Sewage engineering
Slums
Smog
Smoke
Soil Conservation
Soil erosion
Soil exhaustion
Soil pollution
Spraying and dusting residues in agriculture
Thermal pollution of rivers, lakes, etc.
Traffic noise
Waste disposal in the ocean
Water. Pollution (or: Water pollution)
Water. Purification (or: Water purification)
Water conservation
Water quality
Water resources development
Water - supply
Wildlife. Conservation

Appendix B

General Indexes

Applied Science and Technology Index
Education Index
Educational Resources Information Center (ERIC) Research in
Education
Essay and General Literature Index
Monthly Catalog of U.S. Government Publications
New York Times Index
Reader's Guide to Periodical Literature
Social Science and Humanities Index

Periodicals (Continuing Features on the Environment)

American City - "Air Pollution Control News"
Field and Stream - "Conservation" by M. Frome
National Parks Magazine - "News and Commentary"
National Wildlife - "Washington Report" by L. S. Clapper
Saturday Review - "Environment and the Quality of Life" by
N. Cousins
Time - "Environment"

Periodicals (Highlighting Environmental Concerns)

America
American Biology Teacher
American City
Atmospheric Environment
Audubon
Conservationist

Environment
 Journal of Environmental Science
 Journal of School Health
 Journal of the Air Pollution Control Association
 Journal of the Water Pollution Control Federation
 Newsweek
 Saturday Review (Science Issue)
 School Science and Mathematics
 Science
 Science Education
 Science News
 Science Teacher
 Scientific American
 Time
 Today's Health
 U.S. News and World Report

Authors

Ardrey, Robert
 Carson, Rachel
 Commoner, Barry
 Dubos, Rene
 Ehrlich, Paul
 Ewald, William R., Jr.
 Krutch, Joseph Wood
 Linton, Ron M.
 Mead, Margaret
 Rienow, Robert
 Teale, Edwin Way
 Whyte, William H.

Film Indexes

Educators Guide to Free Films. Wisconsin; Educators Progress Service, Inc.

Educators Guide to Free Filmstrips. Wisconsin; Educators Progress Service, Inc.

National Information Center for Educational Media. Index to 16 mm Educational Films. N.Y.; R. R. Bowker

National Information Center for Educational Media. Index to 35 mm Educational Filmstrips. N.Y.; R. R. Bowker

Appendix C

Individuals, groups, and government agencies that may serve as resources for information or as classroom speakers on the environmental issue:

Amateur naturalists in the community
Audubon Society
Chamber of Commerce
City manager
College biologist or ecologist
County Agricultural Extension Agent
County highway department
Farmer
4-H Club
Izaak Walton League
New York State Department of Commerce
New York State Department of Environmental Conservation
New York State Health Department
New York State Museum and Science Service
New York State Water Purification Board
Police department
Representatives of local industry
Sierra Club
State University of New York at Albany Atmospheric Science
Research Center
SCOPE - Suffolk County
Town supervisor
Tree nursery operator
United States National Park Service
Water commissioner

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Writing Consultants

William F. Aylward, Jr., Guilderland Central Schools
Joy W. Baker, Bethlehem Central Schools, Delmar
Lee J. Burland, East Greenbush Central Schools
Michael J. Campos, Fonda-Fultonville Central Schools, Fonda
Linda L. Fitzharris, Colonie Central Schools
Robert B. Goldberg, Levittown Public Schools
Theodore M. Guthridge, Colonie Central Schools
Ann T. Kempner, North Bellmore Public Schools
Joey J. Lelah, Levittown Public Schools
Katharine M. Lien, Guilderland Central Schools
Ann D. Muehleck, Colonie Central Schools
William I. Nennstiel, Fonda-Fultonville Central Schools, Fonda
R. Allan Sholtes, Guilderland Central Schools
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